Warranty

Innkeeper 1rx is covered by a 2-year warranty to be free from defective workmanship and materials. In the event that the Innkeeper 1rx needs repair, you must call us to get an authorization, and then carefully pack and ship it to us. You will pay for shipping to us and we will pay for return back to you, UPS ground. No free repairs will be made if the defect was caused by misuse, weather conditions, or other cause, except for defective workmanship or materials. THERE ARE NO EXPRESSED OR IMPLIED WARRANTIES WHICH EXTEND BEYOND THE WARRANTY HERE MADE.

06/06

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innkeeper 1rx

Digital Hybrid

User Guide

JK Audio

Introduction

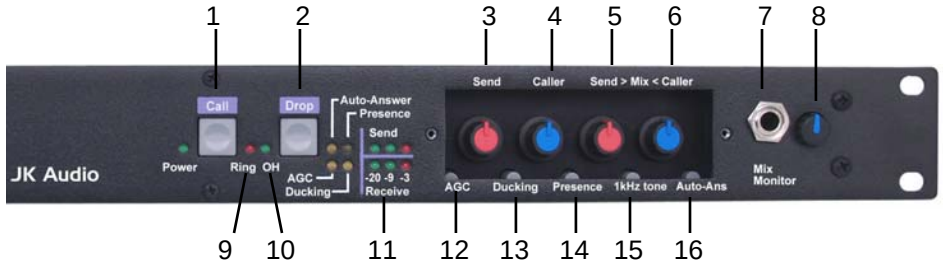
Innkeeper 1rx will allow you to send and receive audio over analog telephone lines. While this may seem like a simple task that any telephone can do, the challenge is getting the best quality audio from such a miserable audio path.

What is a Digital Hybrid?
A digital hybrid connects audio signals to standard analog telephone lines without the variation in quality found with analog hybrids. The main function of a hybrid is to bring in the caller's voice from the phone line as clear and clean as possible. In the real world, when you send your voice down the telephone line it has a tendency to bleed over into the caller's audio. The hybrid must adapt to the phone line to properly separate transmit and receive audio. We use a 16 bit DSP (Digital Signal Processor) to continuously monitor the phone line and audio signals and deliver excellent separation. Our dual-convergence algorithm can achieve excellent trans-hybrid loss, typically exceeding 50 dB, without any setup.

Ready to go?
The innkeeper 1rx controls and connectors are clearly marked and ready for operation. The Features diagrams will help you pinpoint any minor questions that you may have. If this is your first exposure to a hybrid, we suggest that you read the entire manual to allow you to take advantage of all these features.

Any Questions?
Before you pick up the phone... Please thumb through the rest of this manual. You might find those deep technical questions are covered on later pages.

Features—Front View



FCC Registration (continued)

1. **Connection and use with the nationwide telephone network**
   The FCC requires that you connect this telephone equipment to the national telephone network through a USOC RJ-11C modular telephone jack.
   This equipment may not be used with Party Line Service or Coin Telephone Lines
   This equipment is hearing aid compatible.

2. **Information for the telephone company**
   Upon request from your local telephone company, you are required to provide the following information:
   a) The "line" to which you will connect the telephone equipment (that is, your telephone number), and
   b) The telephone equipment's FCC registration number. This can be found on the bottom of your telephone equipment, and,
   c) the ringer equivalence number (REN) for this equipment.
   The REN is used to determine the quantity of devices which will be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of the RENs should not exceed 5.0. To be certain of the number of devices that may be connected to the line, as determined by the total RENs, contact the local telephone company.

3. **Repair Instructions**
   If it is determined that your telephone equipment is malfunctioning, the FCC requires that it not be used and that it be unplugged from the modular outlet until the problem has been corrected. Repairs to this telephone equipment can only be made by the manufacturer or its authorized agents or by others who may be authorized by the FCC. For repair procedures, follow the instructions outlined under the warranty section of the manual.

4. **Rights of the telephone company**
   If telephone equipment is causing harm to the network, the telephone company may temporarily discontinue your telephone service. If possible, they'll notify you before they interrupt service. If advanced notice isn't practical, you'll be notified as soon as possible. You'll be given the opportunity to correct the problem, and you'll be informed of your right to file a complaint with the FCC.
   Your telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper functioning of your JK Audio product. If such changes are planned, you'll be notified by your telephone company.

Specifications

Inputs

Send:	Balanced Female XLR, 1k ohms, -10 mV RMS (-35 dBm nom.) Mic / Line pad switch, Line = +5 dBm nominal

Outputs

Caller:	Balanced Male XLR, 200 ohms, 500 mV RMS (+12 dBm Max.)
Mix Out:	Balanced Male XLR, 200 ohms, 500 mV RMS (+12 dBm Max.)
Headphone:	1/4" Stereo, 8 ohms, 250 mW per channel
Speaker:	Screw Terminals, 8 ohms, 1 watt
Phone Line Connector:	RJ11C
Isolation:	1500 VAC
Ringer:	0.5B REN
Frequency Response:	Telephone side 200 Hz - 3600 Hz
Power:	Universal AC supply, 120-240 VAC, 50-60 Hz 25 watts max.
Size:	1.75" x 7.3" x 10.5" (4.5 x 18.6 x 26.7 cm)
Weight:	5.7 Pounds

FCC Part 15 Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by JK Audio can void the user's authority to operate the equipment.

FCC Registration

Your new JK Audio product has been registered with the Federal Communications Commission (FCC). This product complies with the standards in Part 68 of the FCC rules.

Features—Front View

1 ***Call*** **Button** - Press this button to answer or place a telephone call (takes the line off-hook).

2 ***Drop*** **Button** - Press this button to drop (hang up) a call.

3 ***Send*** **Level** - Adjusts the signal that you are sending down the telephone line.

4 ***Caller*** **Level** - Adjusts the level of the signal coming in from the telephone line, going out the “Caller” jack.

5 ***Send > Mix*** **Level** - Adjust the level of your audio that will be sent to the “Mix Out” jack.

6 ***Caller > Mix*** **Level** - Adjusts the level of caller audio that will be sent to the “Mix Out” jack.

7 ***Headphones*** - The stereo headphone jack contains the signal that you have created with the *send> mix level* and *caller> mix level* controls. Both left and right channels get the same signal.

8 ***Mix Monitor*** - Adjusts the mix signal level sent to the headphone and rear panel speaker terminals.

9 ***Ring*** **LED** - Flickers when you have an incoming call.

10 ***OH*** **LED** - Lit when you are on line with a call (off-hook).

11 ***Signal*** **LEDs** - Send LEDs represent the signal level going out to the telephone line. Receive LEDs represent the signal level coming from the phone line, after the DSP.

12 ***AGC*** - press this switch to allow the innkeeper 1x to automatically adjust the gain of caller audio.

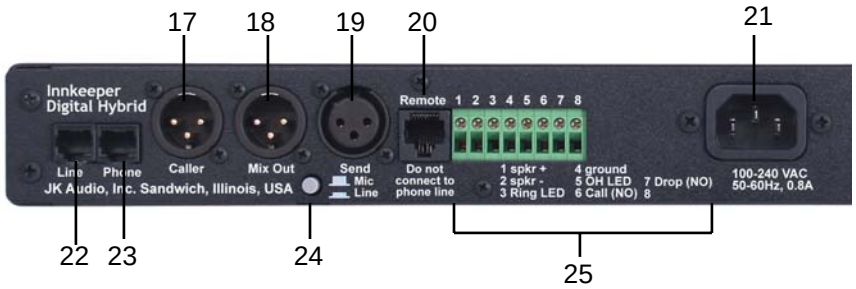
13 ***Caller Ducking*** - press this switch to lower the caller’s audio level by 9 dB when local audio is present.

14 ***Presence*** - press this switch to boost the low end of the caller audio signal. Presence is added to the caller audio signal only.

15 ***1 kHz tone generator*** - press switch once to send a full scale 0 dB, maximum output level 1kHz tone down the phone line, press again to send this signal out the *Caller* jack, press a third time to turn off.

16 ***Auto-Answer*** - Press this switch to enable the innkeeper to automatically answer an incoming call and then disconnect after the caller hangs up. Auto answer will occur on the first ring.

Features—Rear View



17 ***Caller* Output** - Male balanced XLR output contains only the callers voice.

18 ***Mix* Output** - Male balanced XLR output contains a mix of send and receive audio determined by the *send> mix level* and *caller> mix level* controls.

19 ***Send* Input** - Female balanced XLR input for signals going into the phone line. Mic or line level input.

20 ***Remote* Control Jack** - 8 pin modular jack for connection to the JK Audio Guest Module 1 Remote Keypad.

21 ***AC Power*** - Universal AC power input for 100-240 Volt, 50-60 Hz supply current.

22 ***Phone Line*** - Connect to a standard, single line, analog telephone line.

23 ***Aux. Phone*** - Connect a single line analog telephone for call setup / dialing, or producer call screening.

24 ***Mic / Line switch*** - Sets the front end sensitivity of the Send XLR jack. Set to *Mic* if you intend to plug a microphone directly to the Send jack. Set to *Line* if you are connecting to a mic mixer.

25 ***Remote Terminals*** - Screw terminals provide connections for a small loudspeaker, remote LEDs, tape recorder control, or console call control switches.

Operation (continued)

3 Ring LED Supplies +4.3 VDC, 40 mA pulse signal during incoming ring cycles.
4 Chassis Ground
5 OH LED Supplies +4.3 VDC, 40 mA steady signal during an active call.
6 Call (NO) Pull this pin to ground momentarily to simulate pressing the Call button.
7 Drop (NO) Pull this pin to ground momentarily to simulate pressing the Drop button.

Remote Control Jack
The RJ-45 type 8 pin jack on the back of the innkeeper is for connection to a JK Audio Guest Module 1 Remote Keypad. The Guest Module 1 features:

- Ring and Call LEDs
- Call and Drop buttons
- DTMF Keypad
- Keypad disable switch

Also, when you dial using the Guest Module keypad, the tones are sent directly down the phone line, and do not come back blasting in your ear.

Contact your JK Audio dealer for additional information.

FAQ's

? Does the innkeeper 1rx send a burst or beep down the phone line at the beginning of the call like our current hybrid?

! No. Innkeeper 1rx uses the actual transmit signal to evaluate the phone line and tune its algorithm. As you begin to speak, innkeeper 1rx is hard at work canceling your voice from the Caller Output jack. Within milliseconds your voice is reduced into the noise floor.

? Will your innkeeper 1rx provide phantom power for my condenser microphone?

! No, our devices will not provide phantom power. If you plan to connect your microphone directly to an innkeeper 1rx, you should use a dynamic mic.

Operation (continued)

Auto-Answer

The Auto-Answer feature will answer on the first ring. When Auto-Answer is enabled, you can still take calls manually using the call button. When finished, you can either drop the call manually or allow the call to Auto-Disconnect. Innkeeper 1rx will look for a CPC (calling-party-control) disconnect signal or ROH (receiver-off-hook) message from the phone company to determine when a call has disconnected. This can take up to a minute.

1 kHz Tone Generator

The 1 kHz tone generator is used for setting levels. When pressed once a full scale 0dB maximum output level signal is sent down the phone line. This will allow you to calibrate levels at the other end of the call. When pressed again, this same signal is sent to the *caller* output only. This will allow you to calibrate the signal level at your console. The tone generator is disabled when pressed a third time.

Dry Lines

Innkeeper 1rx was designed to work on standard (wet) telephone lines as well as on custom pbx (dry) lines. Dry line installation is always a custom configuration and requires substantial telephone system knowledge. These installations are found in radio and television studios for both PBX and intercom applications.

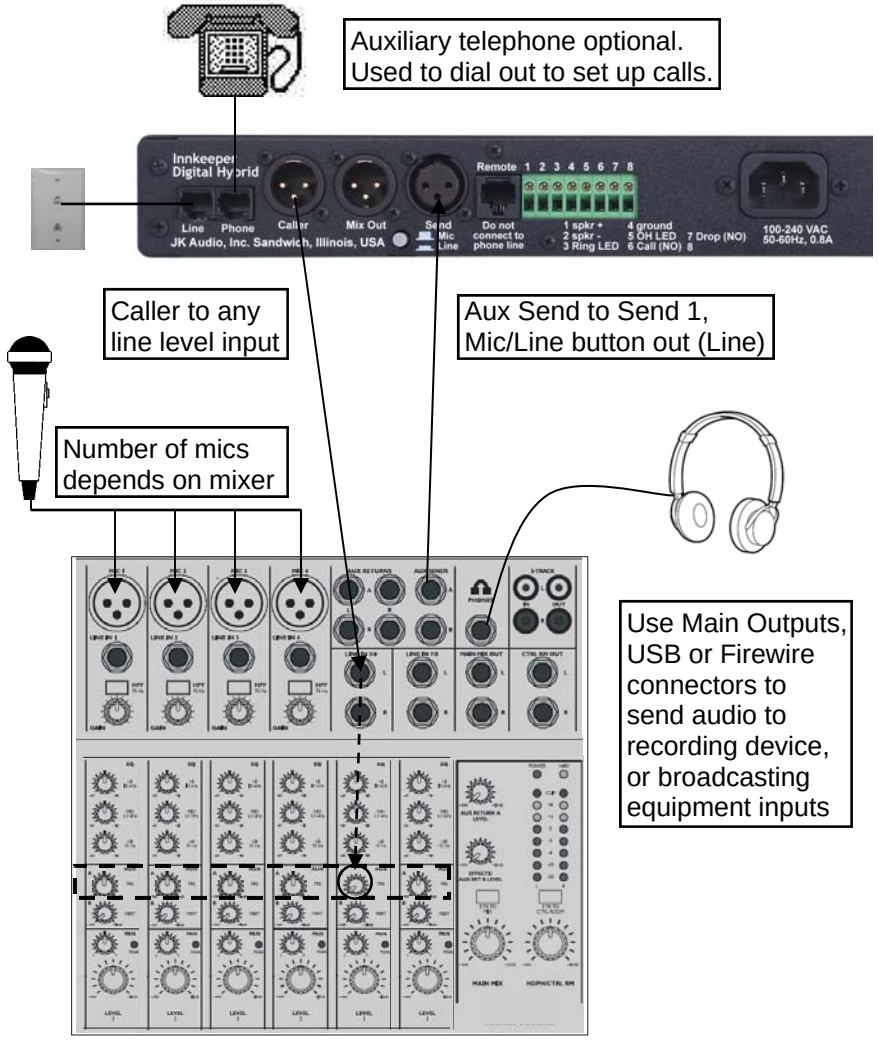
Wet lines are typical tip / ring telephone lines that carry ring voltage, talk battery, and full duplex, balanced audio over two wires to an analog telephone. Dry lines carry the balanced, full duplex audio but without the ring voltage or talk battery. innkeeper does allow dry line operation with a few limitations:

- If talk battery is not present when the Call button is pressed, a dry line is assumed.
- If talk battery suddenly appears during a “Dry Line” call, it becomes a wet line call, and auto-disconnect will occur when a disconnect signal occurs, or if talk battery disappears.
- Auto-answer does not work on a dry line.
- The aux telephone jack will not support an analog telephone during a “Dry Line” call.

Rear Screw Terminals

1 Speaker (+) Minimum 8 ohms, 1 watt max
2 Speaker (-) Use together with terminal 1

Connection—Mix-Minus Setup


Auxiliary telephone optional.
Used to dial out to set up calls.
Caller to any line level input
Aux Send to Send 1, Mic/Line button out (Line)
Number of mics depends on mixer
Use Main Outputs, USB or Firewire connectors to send audio to recording device, or broadcasting equipment inputs
Line
Phone
Caller
Mix Out
Send Mic Line
Remote
Do not connect to phone line
JK Audio, Inc. Sandwich, Illinois, USA

For whichever input channel you have the Caller connected to, turn the corresponding Aux control to minimum (usually hard left). All other Aux controls should be set for what you want to send to the phone line. Each Aux Send bus is completely separate from all other outputs, so these Aux controls will not affect what is heard on the Main outputs or on any other Aux buses. This Aux Send bus should be pre-fader, so you can use the fader controls to set the levels of each channel to the main output.

Operation

Connecting Cables

Although each application will require a slightly different setup, there are four cables that everyone can agree upon:

1 Phone Line - Connect the supplied RJ-11 phone line cable between the jack marked “Line” and your wall jack. Be sure this jack can support standard analog telephone operation.

2 Send Audio - Connect a microphone or mixing console output XLR cable to the Send jack on the innkeeper. Be sure to set the innkeeper mic/line switch to the proper position for your application

3 Caller Audio - Connect the Caller Out jack to an input on your mixing console.

4 Power - Connect the supplied AC power cord to the back of the innkeeper and then to an AC power outlet.

Your innkeeper 1rx is now ready to take calls. You may want to connect an auxiliary telephone to the innkeeper for call setup, or you can simply use Auto-Answer or the Call button to answer an incoming call.

Auxiliary Telephone

Innkeeper 1rx does not disconnect the auxiliary telephone when you press the call button. In fact, the DSP continuously monitors the telephone line to achieve maximum separation between transmit and receive signals. You can use an auxiliary telephone to place or screen a call, and then you can place the call on hold. When you are ready to take the call on innkeeper 1rx, simply press the call button. Your telephone will automatically release the hold while you talk. If you need to take the call back on the aux telephone, simply pick up the phone before the innkeeper drop button is pressed. If you would prefer the old world way of disconnecting the aux jack when the hybrid takes the call, please refer to the *optional jumper settings* section.

Optional Jumper Settings

On the circuit board, jumper 1 controls incoming caller level. In factory default closed position caller input is normal level. In optional open position, incoming caller level is –6dB. This does not affect transmit level. This option is not necessary except in some conditions where phone line is unusually “hot”. Only set this option if incoming caller level is too loud.

Operation (continued)

Jumpers 2 and 3 control whether or not phone line jack and phone switched or bridged. In the factory default closed position, jacks are bridged together. In the optional open position the jacks are switched. This means that when the “call” button is pressed any phones connected to the phone jack of the innkeeper are disabled. When the “drop” button is pressed phones become active again.

Send Signal Level

The Send LEDs display the signal level as it goes out to the phone line. The goal is to drive the phone line at high enough levels to avoid phone line noise, but not so loud as to cause excessive clipping.

Adjust the send level control until you see occasional flashes of the red -3dB peak Send LED. These flashes should occur during loud speech bursts. If the red LED stays lit for extended periods you can assume that much of your speech is being clipped or distorted. In this case you should back down on the Send volume control.

Receive Signal Level

The receive LEDs display the signal coming from the phone line and out of the DSP. The Caller level control does not change what you see on these LEDs. Adjust the Caller level control to give you the best signal at your equipment.

AGC

When the Automatic Gain Control is used, innkeeper 1x automatically adjusts the caller level to maintain acceptable levels between calls. In this way an unusually loud caller will be similar in level to the unusually soft caller.

Caller Ducking

The Caller Ducking option lowers the level of the caller’s audio by 9dB when local audio is present. This is a good way to regulate the obnoxious callers when the talent is speaking.

Presence

The Presence feature is a custom digital filter that boosts low frequencies in the 120Hz to 500Hz region to compensate for losses in the telephone network. This is a single ended algorithm that treats only the caller signal before it leaves the digital hybrid. You may notice that is has more of an effect on low pitched, or deeper voices.